WHEN MAN BEGAN: OR THE DOOR-STEP OF HOMINITY MILLION YEARS AGO AT GARUSI (TANZANIA)

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Abstract

New discoveries of Australopithecus anamensis *draw attention to the craniodental morphology uniting Garusi Hominid I and* Homo. *The reconstructed maxillary dental arcade of Garusi Hominid 1, dated 3.6 Myr, is described. The mosaic of primitive and derived features shared shows Garusi more directly related to Homo than* Australopithecus afarensis. *This condition bridges directly* Pre-Australopithecus *to* Homo.

Keywords: Early hominid, maxilla, Garusi, *Australopithecus, Homo.*

Hominid fossils discoveries have provided several australopithecine species, from 1 to 5 million years (Myr), with some human characteristics. The record is still fragmentary and there are many morphological gaps, however comparison of the fossils establishs a divergence of forms from character displacement with time that can be attibuted to the evolutionary pressure on successive and competing species.

At this point, the most primitive creature, *Ardipithecus ramidus* defined on the basis of erect posture, is seen as possibly including ancestor dental characteristics of *Australopithecus* and *Homo* (Gee, 1995). Hominid species have revealed a temporal increase in enamel thickness and chedkteeth megadontia with *Ardipithecus* intermediate between *Pan* and the *Australopithecus afarensis* / early *Homo* condition (White *et al.* 1994).

The next oldest hominid species, *Australopithecus anamensis* dating from 3.9 to 4.2 Myr, has close affinities with *Ardipithecus* and the laetoli specimens *A. afarensis*. The parallel tooth rows, very large size of the canines relative to the postcanine teeth, canines vertically implanted and the very narrow palate of *A. anamensis* resemble the Garusi hominid condition described by Puech (1986a) as a Pre-*Australopithecus* (Leakey *et al.* 1995).

Garusi hominid was found by kohl-Larsen the 8th of february 1939 in the Laetolil Beds in Tanzania. The specimen, holotype of *Meganthropus africanus* (Weinert, 1950) is an upper right maxilla broken off at the sutura palatina mediana up to the formen incisivum. It bears the two premolars with the alveoli of the canine and incisors.

The nasoalveolar clivus is an elongated oval that projects 10 mm into the nasal cavity. In *Homo* the nasoalvelar clivus is significantly more vertically disposed and the palate is much deeper (Puech *et al.* 1986).

In Garusi the central and lateral incisor roots dimensions are close to each other and the lateral incisor root is placed directly beneath the nasal apeture as it is in "robust" australopithecines and *Homo*. The tooth row is not interrupted by a I^2/C diastemata as it is in *A. afarensis* where the position of I^2 roots relative to margins of nasal aperture is partly lateral.

A distal expansion of the cervical portion of the robust root is typical of the primitive nature of the upper canine with a developped mesiodistal diameter. The canine crown shape have been reconstructed after root comparisons, very similar to Laetoli hominid 5. A primitive canine with mesiodistally dimension equal to the buccolingual one (Fig.1). With this canine shape, Garusi hominid exhibits less alveolar prognathism than *A. afarensis*, approaching an orthognathic condition relative to *Homo habilis* as it is evidenced when the maxilla of Garusi is opposed to the mandible of *H. habilis* Olduwai hominid 7 (Fig.2).

The orthoganthic condition in Garusi does not obscures the nasoalveolar contour as it does in most "robust" *Australopithecus*. Kimbel *et al.* (1984) have described the anterior alveolar contour in apes and *A. afarensis* consisting of two distinct contours, the superior formed by the outline of the nasocanine contour intersecting the convex nasoalveolar clivus. This condition is present in Garusi and also developed in *H. habilis - H. rudolfensis* (KNM. ER 1470) and *Homo erectus* from Tautavel dated 0.45 Myr.

The distinctive suite of the *A. afarensis* hominid dental characteristics include the P^3 slightly larger than P^4 with P^3 sometimes three rooted with a mesiodistal elongation of the buccal crown portion (White, 1977; Johanson and White, 1979). In Garusi P^3 is occlusally, bucally and lingually asymetric and larger than P^4. After correction of the interproximal wear, the P^3 is a mesiodistally large tooth; 9.7 mm, with major buccal and lingual cusps 6.4 mm apart. The lingual cusp is placed mesial of the buccolingual crown axis. Maximum breadth or buccolingual diameter is 12.45 mm (Puech *et al.* 1985). Compared to the *A. afarensis* mesiodistal values, 7.1 to 9.3 mm, the mesiodistal diameter of the P^3 in Garusi is high.

The very developped mesiodistal diameters of the P^3 and the C, with the close together and nearly parallel tooth rows give to the Garusi dental arcade a specific "U" shape (Fig. 3). This suite of characters augmented by the lack of forward growth on anterior maxilla, is distinguishing pre-Australopithecus Garusi from *A. afarensis* (Puech, 1986 b).

In conclusion, the large canines and orthognathic midface places Garusi more directly related to *Homo* than *A. afarensis* (Fig. 4). A relative large P^3 compared to P^4 indicates that the apomorphic condition of molarisation in further australopithecines is not present (Mc Henry, 1984).

From a functional perspective, reduced incisors dimensions, megadontia and the increase midfacial verticality trends toward maximizing and speading vertical forces. Walker's interpretation (1981) of adaptation to abrasive food and processing of small hard objects proposed by Jolly (1970) are fully compatible with our observations.

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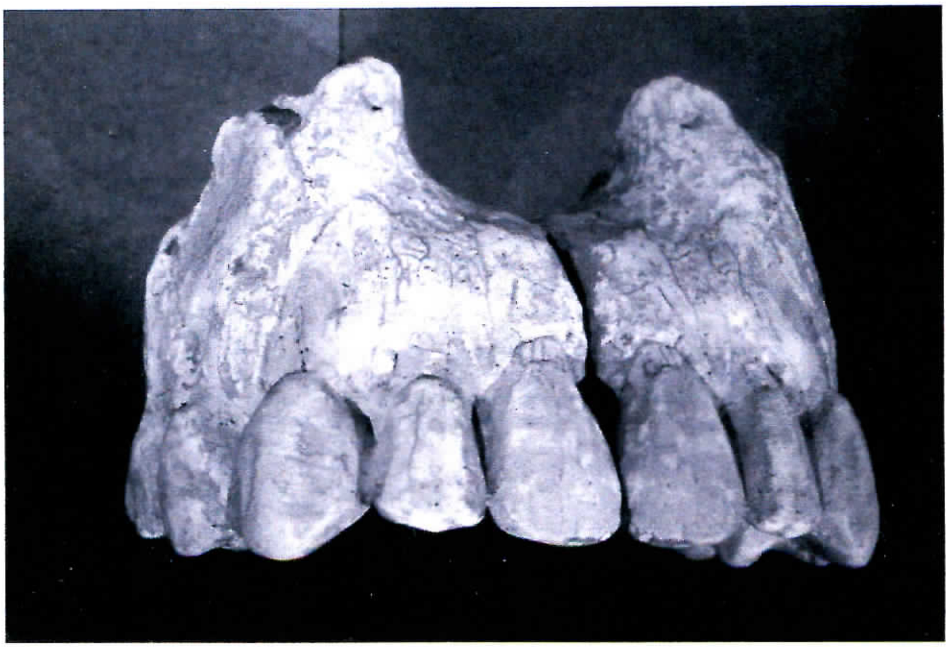


Fig. 1. The reconstruted maxilla of Pre-*Australopithecus* Garusi Hominid I (3.6 Myr).

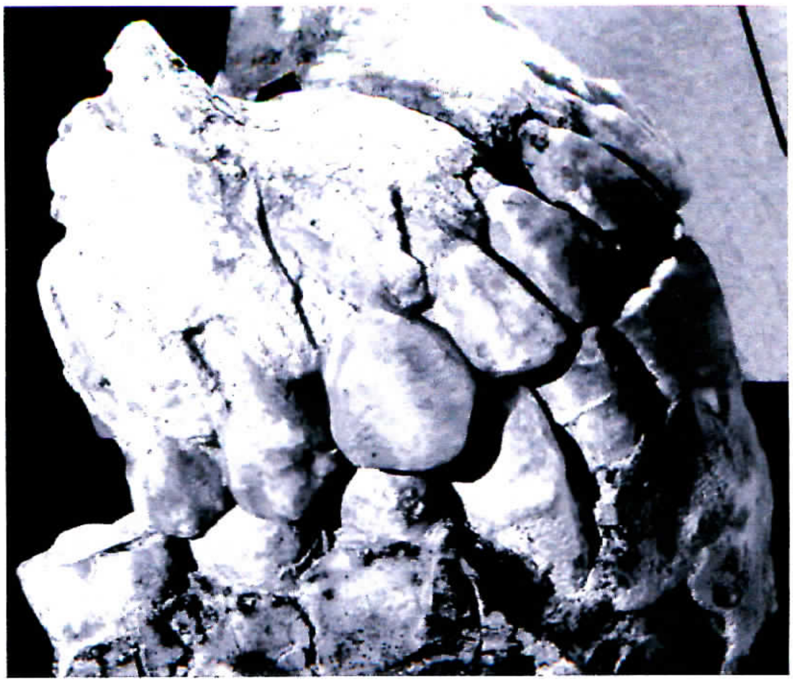


Fig. 2. The upper jaw of Garusi Hominid I fits with the mandible of *Homo habilis* Olduvai Hominid 7 (1.8. Myr).

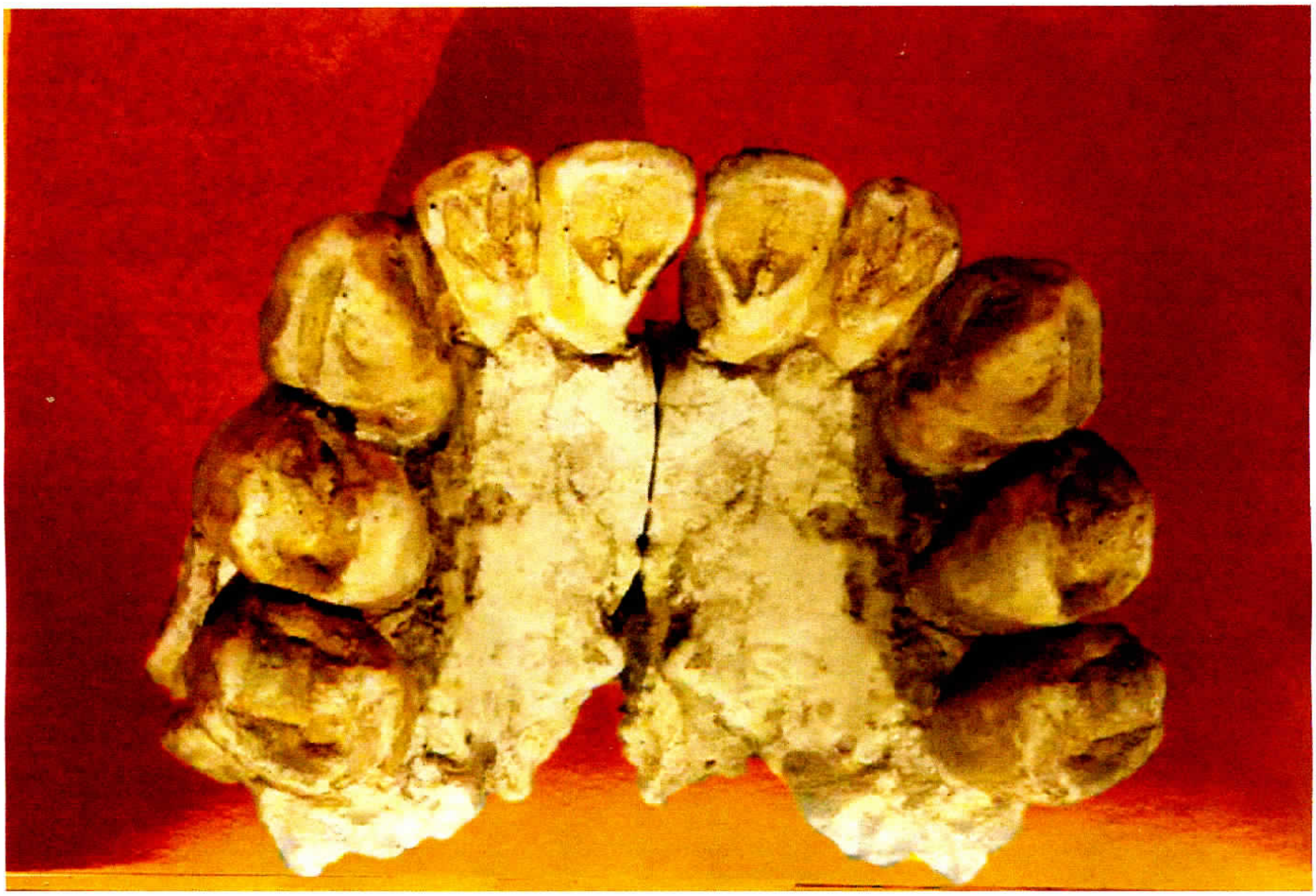
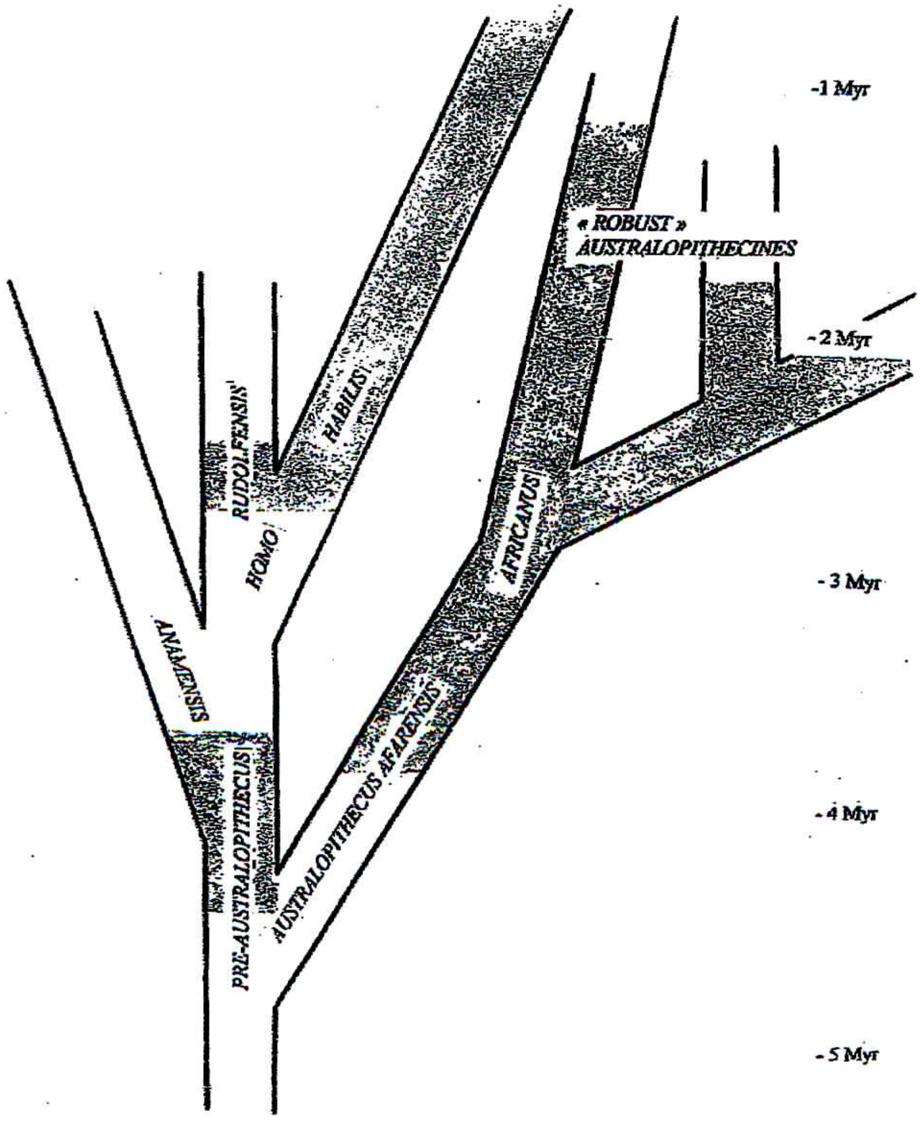


Fig. 3. The specific "U" shape of the Garusi dental arcade distinguishing Pre-*Australopithecus*, more directly related to *Homo* than to *Australopithecus afarensis*.


PRE-AUSTRALOPITHECUS
ANAMENSIS
AUSTRALOPITHECUS AFARENSIS
HOMO
RUDOLFENSIS
HABILIS
AFRICANUS
« ROBUST »
AUSTRALOPITHECINES
-1 Myr
- 2 Myr
- 3 Myr
- 4 Myr
- 5 Myr

Tab. 1.